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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,408	07/18/2003	Kwun-Wing W. Cheung	7784-000625	6404

27572 7590 02/22/2006

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EXAMINER

BRINEY III, WALTER F

ART UNIT	PAPER NUMBER
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2646

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/623,408

Applicant(s)

CHEUNG, KWUN-WING W.

Examiner

Walter F. Briney III

Art Unit

2646

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>12/08/03; 07/18/03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. **Claims 1, 9-11, 17-19 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Parrella et al. (US Patent 6,215,884).**

Claim 1 is limited to “a high fidelity sound system for a mobile platform.” Parrella discloses a piezo speaker for an improved passenger cabin audio system. See Abstract. Figure 12 depicts an aircraft cabin. See column 5, lines 42-43. In this view, a plurality of piezo elements 102-105, which correspond to “a plurality of exciters,” are attached to “plurality of panels.” See column 5, lines 44-51. Parrella discloses that the piezo elements vibrate the panels as recited. Parrella also discloses a crossover network 106, which corresponds to “a processing center.” In operation, the crossover sends low frequency signals to thinner, more flexible panels, and the crossover sends high frequency signals to stiff panels. In this way, “the exciters generate sound waves having frequencies within a specific bandwidth that is based on the panel to which each excited is affixed.” Therefore, Parrella anticipates all limitations of the claim.

Claims 10 and 11 are limited to methods whose steps are inherently performed by the sound system of claim 1, as covered by Parrella; and thus, are rejected for the same reasons.

Claims 18 and 19 recite essentially the same subject matter as claim 1, as covered by Parrella; and thus, are rejected for the same reasons.

Claim 9 is limited to "the system of claim 1," as covered by Parrella. As seen in figure 12 and column 5, lines 42-55, "the exciters" 102-105 "are distributed throughout the passenger cabin in a support array such that high fidelity sound fills a large sound field that includes all normal listening areas of the cabin." Therefore, Parrella anticipates all limitations of the claim.

Claim 17 is limited to a method whose steps are inherently performed by the system of claim 9, as covered by Parrella; and thus is rejected for the same reasons.

Claim 27 recites essentially the same subject matter as claim 9, as covered by Parrella; and thus, is rejected for the same reasons.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 2, 15 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parrella in view of Kolster (US Patent 1,675,031).**

Claim 2 is limited to "the system of claim 1," as covered by Parrella. It is noted that Parrella is silent concerning the frequency response of the exciters as dictated by the crossover network. Therefore, Parrella fails to anticipate "control[ling] the exciters

so that the amplitudes" are shaped as recited. However, this deficiency is overcome by an obvious modification.

In particular, crossover networks and their principles were notoriously well-known in the prior art at the time of the invention. One such crossover is disclosed by Kolster. As seen therein, a plurality of speakers 131, 231 and 331 are coupled to a source of audio signals by way of tuned networks 125, 225 and 325. Kolster discloses the fact that speakers have inherent distortion based on natural resonances. As a result, every loudspeaker provides a different amount of efficiency over a certain frequency range. Kolster discloses that a crossover network with the ideal frequency response shown in figure 2 will provide a smooth curve 4 that is essentially free of distortion. See lines 56-97. With respect to the claim language, figure 2 clearly indicates that the frequencies near "a lower outer boundary range" of a "bandwidth" and near "an upper outer boundary range" of a "bandwidth" are "attenuated," resulting in "a smooth frequency cross-over."

It would have been obvious to one of ordinary skill in the art to design a crossover network to provide a flat frequency response even while using a plurality of loudspeakers that each include different resonant frequencies as taught by Kolster simply because Parrella fails to disclose the desired frequency response of the crossover network 106 and because doing so eliminates distortion.

Claim 15 is limited to a method whose steps are inherently performed by the system of claim 2, as covered by Parrella in view of Kolster; and thus is rejected for the same reasons.

Claim 23 recites essentially the same subject matter as claim 2, as covered by Parrella in view of Kolster; and thus, is rejected for the same reasons.

3. **Claims 3, 16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parrella in view of Kolster and further in view of Modafferi (US Patent 4,771,466).**

Claim 3 is limited to “the system of claim 2,” as covered by Parrella in view of Kolster. It is noted that neither Parrella nor Kolster disclose, teach or suggest adjusting the phase of the signals produced by the exciters. Therefore, Parrella in view of Kolster fails to make obvious “control[ling] the exciters so that a phase timing of the sound waves...is adjustable to coordinate the phase timings among all the sound waves so that sound emanating from the panels is reproduced correctly.” However, this deficiency is overcome by an obvious modification.

Since the work of Kolster, practitioners—like Modafferi—have recognized the importance of providing not just flat frequency response, but zero phase-shift over all frequencies. See Modafferi, column 2, lines 54-62. Modafferi recognizes that creating a perfect crossover (equation 1) is essentially impractical, and instead focuses on creating an approximation. See column 2, lines 5-12. As a result, Modafferi designed the network of figure 3, which provides a linear phase response over the entire audible frequency range as seen in figure 9. In this way, Modafferi teaches a crossover that “controls the exciters so that a phase timing of the sound waves...is adjustable to coordinate the phase timings among all the sound waves so that sound emanating from the panels is reproduced correctly.”

It would have been obvious to one of ordinary skill in the art at the time of the invention to design a crossover network with linear phase over the entire audible range as taught by Modafferi for the purpose of approximating the ideal crossover network, resulting in reduced distortions.

Claim 16 is limited to a method whose steps are inherently performed by the system of claim 3, as covered by Parrella in view of Kolster and further in view of Modafferi; and thus is rejected for the same reasons.

Claim 24 recites essentially the same subject matter as claim 3, as covered by Parrella in view of Kolster and further in view of Modafferi; and thus, is rejected for the same reasons.

4. **Claims 4, 5 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parrella in view of Kolster in view of Modafferi and further in view of Takahashi et al. (US Patent 4,229,619).**

Claim 4 is limited to "the system of claim 3," as covered by Parrella in view of Kolster and further in view of Modafferi. As shown in the rejection of claim 2, Parrella discloses a crossover network that controls frequencies in the manner taught by Kolster. This teaching corresponds to "a cross-over point adjustment device" as recited. As shown in the rejection of claim 3, Modafferi teaches a crossover network that is specifically designed to provide linear phase response. In particular, figure 3 depicts a "frequency delay device" 22. Therefore, the cited prior art anticipates all limitations of the claim with the exception of "a frequency equalizer." However, this deficiency is overcome by an obvious modification.

In particular, Takahashi teaches a method and apparatus for driving a multi way speaker system that includes a plurality of speakers 24, 26 and 28 that respectively receive spectrally-separated signals from filters 14, 16 and 18. Takahashi recognizes that the filters are not ideal and create signal distortions. See column 1, lines 27-52. In solution, Takahashi provides a negative feedback loop with a plurality of equalizing elements that compose a "frequency equalizer" as recited. See Abstract and figure 1, elements 34, 36, 38, 60 and 62.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include negative feedback in a crossover network as taught by Takahashi, thereby providing equalization that reduces distortions caused by the crossover filters.

Claim 5 is limited to "the system of claim 3," as covered by Parrella in view of Kolster in view of Modafferi. This claim broadly recites each element of claim 4, and is rejected for the same reasons.

Claim 25 recites essentially the same subject matter as claim 4, as covered by Parrella in view of Kolster in view of Modafferi and further in view of Takahashi; and thus, is rejected for the same reasons.

5. **Claims 6, 7, 12, 13, 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Parrella.

Claim 6 is limited to "the system of claim 1," as covered by Parrella. It is noted that Parrella generally discloses providing low and high signals to piezo elements that drive panels with diverse resonance characteristics. See column 5, lines 42-55.

Parrella discloses that stiff panels are best suited for high frequencies while more

flexible panels are best suited for low frequencies. Parrella notes in another embodiment that the roof and sidewalls of a vehicle cabin are suited for providing wideband audio reproduction, particular mid-to-high as evidenced by the ancillary subwoofer 85. However, Parrella fails to disclose a particular bandwidth.

As pointed out above, Parrella uses a crossover network to drive panels only with those signals that best match their resonance as determined by their flexibility/stiffness characteristics. As a result the particular frequency range recited in this claim is the result of a set of design parameters that the applicant has failed to indicate provide a particular purpose, function or advantage.

It would have been obvious to one of ordinary skill in the art to simply choose sidewall materials with the resonant characteristics claimed because the applicant has not shown that such design characteristics provide a particular purpose, function or advantage.

Claim 12 is limited to a method whose steps are inherently performed by the system of claim 6, as covered by Parrella; and thus is rejected for the same reasons.

Claim 20 recites essentially the same subject matter as claim 6, as covered by Parrella; and thus, is rejected for the same reasons.

Claim 7 is limited to "the system of claim 1," as covered by Parrella. As noted in the rejection of claim 6, Parrella discloses driving a roof to provide mid-to-high frequencies. Furthermore, the bandwidth as recited in this claim is a mere design choice, and is obvious for the same reasons presented in the rejection of claim 6. Therefore, Parrella makes obvious all limitations of the claim.

Claim 13 is limited to a method whose steps are inherently performed by the system of claim 7, as covered by Parrella; and thus is rejected for the same reasons.

Claim 21 recites essentially the same subject matter as claim 7, as covered by Parrella; and thus, is rejected for the same reasons.

6. **Claims 8, 14 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parrella in view of Azima et al. (US Patent 6,324,294).**

Claim 8 is limited to "the system of claim 1," as covered by Parrella. It is noted that Parrella fails to anticipate driven a "floor panel" as recited. However, this deficiency is overcome by an obvious modification.

In particular, Azima teaches that instead of using a subwoofer, like subwoofer 85 of Parrella, one of ordinary skill in the art could drive a floor panel of a vehicle cabin. See column 4, lines 16-24. One apparent result is that a large, expensive subwoofer is no longer required for adequate bass response.

It would have been obvious to one of ordinary skill in the art to replace a subwoofer or to simply drive a floor panel with low frequencies as taught by Azima simply because Parrella fails to identify the particular panel of figure 12 that is driven with low frequencies and because doing so reduces the need for an extra subwoofer in the embodiment of figure 10.

Furthermore, the bandwidth as recited in this claim is a mere design choice, and is obvious for the same reasons presented in the rejection of claim 6. Therefore, Parrella in view of Azima makes obvious all limitations of the claim.

Claim 14 is limited to a method whose steps are inherently performed by the system of claim 8, as covered by Parrella in view of Azima; and thus is rejected for the same reasons.

Claim 22 recites essentially the same subject matter as claim 8, as covered by Parrella in view of Azima; and thus, is rejected for the same reasons.

7. **Claims 4, 5 and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Parrella in view of Kolster in view of Modafferi in view of Takahashi and further in view of Azima.

Claim 26 is limited to "the mobile platform of claim 25," as covered by Parrella in view of Kolster in view of Modafferi and further in view of Takahashi. In the embodiment of figure 10, Parrella discloses a plurality of speakers within the sidewalls and roof of a vehicle's interior. However, Parrella includes a subwoofer 85 instead of a floor panel radiator as recited. As shown in the rejection of claim 8, it would have been obvious to replace a subwoofer with a floor panel radiator in the manner taught by Azima for the purpose of eliminating the space requirements of housing a subwoofer within the vehicle. Furthermore, apropos the rejections of claims 6-8, the particular bandwidth of each panel radiator is a mere design choice. Therefore, Parrella in view of Kolster in view of Modafferi in view of Takahashi and further in view of Azima makes obvious all limitations of the claim.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F. Briney III whose telephone number is 571-272-7513. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WFB


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SUPERVISORY PATENT EXAMINER